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ABSTRACT

Instruments measuring Carl Jung's (1921/1971) theory of psychological types have been widely used in various counseling contexts. The most popular measure of types has been the Myers-Briggs Type Indicator (K. Briggs and I. Myers). This measure has been criticized for dichotomous scoring, forced-choice response formats, and differential gender weighting of item responses. Two studies, one involving 207 college students and the other involving 894 college students, were conducted to explore the psychometric properties of scores from an alternative measure of types, the Personal Preferences Self-Description Questionnaire (PPSDQ) (B. Thompson, 1996). Results are compared with those from related previous studies involving the Myers and Briggs measure or the PPSDQ. Results regarding the psychometric properties of PPSDQ scores were very encouraging and were consistent with previous results for the same measure. They were as good as, or superior to, results reported for the Myers and Briggs measure. Appendixes contain item analysis statistics for the PPSDQ, a table of gender differences on PPSDQ scales, a variance/covariance matrix for one of the studies, and varimax-rotated component function/structure coefficients for one study. (Contains 3 tables, 1 figure, and 32 references.) (SLD)

Psychometric Properties of Scores on a New Measure of Psychological Type

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Psychometric Properties of Scores on a New Measure of Psychological Type

Abstract

Instruments measuring Carl Jung's (1921/1971) theory of psychological types have been widely used in various counseling contexts, including career counseling, marital and family therapy, and team-building. The most popular measure of types was developed by Katherine C. Briggs and her daughter, Isabel Briggs Myers. But the measure has been criticized for (a) dichotomous scoring, (b) forced-choice response formats, and (c) differential gender weighting of item responses. Two studies (n_1 = 207; n_2 = 894) were conducted exploring the psychometric properties of scores from an alternative measure of types, the Personal Preferences Self-Description Questionnaire (PPSDQ). Results are compared with those from related previous studies involving the Myers and Briggs measure or the PPSDQ.

Instruments measuring Carl Jung's (1921/1971) theory of psychological types have been widely used in various counseling contexts, including career counseling, marital and family therapy, and team-building. Older Jungian measures include the Grey-Wheelwright Jungian Type Survey (GW-JTS; Wheelwright, Wheelwright & Buehler, 1964); the Singer-Loomis Inventory of Personality (Singer & Loomis, 1984; revised into the Singer-Loomis Type Development Inventory [SL-TDI]--Singer, Loomis, Kirkhart & Kirkhart, 1996); the Keirsey Temperament Sorter (Keirsey & Bates, 1984); and the Murphy-Meisgeier Type Indicator for Children (Meisgeier & Murphy, 1987).

Jung posited that people generally have preferences for either of two attitudes: Extraversion or Introversion (EI). He also posited that people differentially prefer functions for perceiving (i.e., Sensing vs. iNtuition [SN]) and for interpreting their perceptions (i.e., Thinking vs Feeling [TF]). An individual's three most preferred of the four functions are termed that individual's "dominant," "auxiliary," and "tertiary," respectively. Preferences for Judging as against Perceiving (JP) orientations to the world may be useful in inferring function dominance (Myers & McCaulley, 1985). Taken together, combinations of these four pairs of preferences delineate 16 possible psychological types (e.g., INTJ, ESFP).

Myers and Briggs Measure

However, the most widely used measure of psychological type is the measure developed by Katherine C. Briggs and her daughter, Isabel Briggs Myers (cf. Myers & McCaulley, 1985). Jackson, Parker

and Dipboye (1996) noted that the Myers-Briggs measure is "the most widely used personality instrument" used in various counseling and assessment situations, "with between 1.5 and 2 million persons completing it each year" (p. 99).

Jungian measures have been so popular for at least three reasons. First, as Thompson and Ackerman (1994) noted in A Counselor's Guide to Career Assessment Instruments, Jungian measures may be so popular because they assess normal variations in personality, and more people have normal as opposed to abnormal personalities.

Second, the measure also may be so popular because results seem to have high face validity for many clients (Carskadon, 1975; Carskadon & Cook, 1982). That is, when participants were asked to choose the type description that best suited them, the description of their actual tested type was chosen to a statistically significant degree more often than descriptions of other types.

Third, the measures are popular because they are value neutral, and view different type preferences merely as "gifts differing." That is, there are "no good or bad, or sick or well types. All types are valuable" (Myers & McCaulley, 1985, p. 53).

Criticisms of the Myers and Briggs Measure

Although the Myers-Briggs measure has been very popular, nonetheless heated controversy has occurred as regards the measure's psychometric properties (cf. Carlson, 1989; Healy, 1989; McCaulley, 1991; Merenda, 1991). In particular, three criticisms may be argued.

Dichotomous scoring. Although continuous scores can be

computed for the Myers and Briggs' measure (see Myers & McCaulley, 1985, pp. 9-10), the use of such scores is strongly discouraged:

> Quantitative interpretation of the MBTI scores is not recommended. Scores were designed to show the direction of a preference, not its intensity. (p. 58)

Furthermore, the item responses on the measure are multiplied by a set of weights designed not to optimize the psychometric properties of continuous scores on the measure, but instead to optimize the "prediction ratios" for dichotomous type classifications (Myers & McCaulley, 1985, pp. 146-147).

Indeed, if an examinee scores the same on both scales of a given dimension, the manual's scoring system always resolves even score ties as a non-zero preference score. For example, 11 points on J and 11 points on P results in a preference score of 1 for P (p. 9), and a continuous score of 101 on JP (p. 10).

However, although Jung conceptualized personality as involving distinct preferences for attitudes and functions over their polar opposites (e.g., E vs. I), he did not assume that all people have definitive preferences. For example, he noted regarding the E and I attitudes that people would generally

> divide human beings into two groups--*provided the whole of humanity consisted of highly differentiated people*. Since this is *obviously not the case*, one can only say that this difference of attitude becomes plainly observable only when we are confronted with a comparatively well-differentiated

personality. (Jung, 1921/1971, p. 549, emphasis added)

Thus, the use of dichotomous rather continuous scores has been criticized (Cowan, 1989; Garden, 1991; Girelli & Stake, 1993; Loomis & Singer, 1980). In fact, most of the Jungian measures have this same failing, except for the Type Indicator for Children, which creates an "undifferentiated" classification on each scale (Meisgeier & Murphy, 1987, p. 9).

Forced-choice response format. Most of the Jungian measures, including the Myers-Briggs, use a forced-choice (i.e., "ipsative") response format. In such a format, an item presents two or more alternatives, only one of which may be selected. It has been suggested that such a format should be used "because type theory postulates dichotomies" (Myers & McCaulley, 1985, p. 141). Even if that view is not accepted, it is suggested that "the forced-choice format also has the advantage of avoiding bias of acquiescent and social desirability response sets" (p. 141).

Unfortunately, forced-choice, ipsative response formats as a statistical artifact inherently yield spurious negative correlations among item responses (Kerlinger, 1986, p. 463). Furthermore, it is not clear that a personality well differentiated from a Jungian point of view would be unable or unwilling to express normal variations in preferences if a more conventional response format was used.

In fact, at least one Jungian measure (SL-TDI; Singer, Loomis, Kirkhart & Kirkhart, 1996) does use a Likert-type response format. However, the SL-TDI differs from other Jungian measures in that

functions are measured and scored within the context of attitudes (e.g., "Extraverted Thinking," "Introverted Thinking"), rather than as separate scales (e.g., EI, TF).

Differential gender weighting. On the Myers-Briggs, item responses are differentially weighted to optimize prediction of types (pp. 146-150). However, on the TF dimension different sets of weights are employed for males and females. Without cited empirical basis, gender differences in response profiles on TF are "ascribed either to the *possibility* that certain feeling responses were more socially desirable for females than males, or to the effect of social training" (Myers & McCaulley, 1985, p. 148, emphasis added). On this basis, on the Myers-Briggs differential weighting systems are employed for TF items to adjust statistically for presumed socialization effects.

It is not clear whether observed gender differences have a socialization basis. In any case, if gender differences are real and systematic, whatever their basis, it is still arguable that statistical adjustment to minimize real differences is inappropriate. Furthermore, one consequence of differential weighting of responses by males and females is that on this scale observed scores may not be comparable across genders. The Myers-Briggs measure is the only measure that invokes such differential item-response weighting across gender.

Purposes of the Present Studies

The Personal Preferences Self-Description Questionnaire (PPSDQ; Thompson, 1996) was developed to avoid the criticisms leveled at the Myers-Briggs and related Jungian measures. The PPSDQ

items were revised and refined in a series of studies employing various statistical analyses and samples (cf. Arnau, Thompson & Rosen, in press; Kier, Melancon & Thompson, 1998; Mittag, in press; Thompson & Melancon, 1996; Thompson & Stone, 1994).

The two studies described here were conducted to address three research questions. The first study was conducted primarily to address the research question:

1. What are the stability (i.e., test-retest) reliability coefficients of scores on the four PPSDQ scales?.

The second study was conducted to address two research questions:

2. What are the internal-consistency (i.e., alpha) reliability coefficients of scores on the four PPSDQ scales?; and
3. What are the concurrent validity coefficients of scores on the four PPSDQ scales with related continuous scores from the Myers-Briggs measure?.

Instrumentation

PPSDQ

Both studies involved the use of the PPSDQ, which consists of 55 word-pair items and 38 sentence items that are posited to measure each of four basic psychological dimensions (i.e., Introversion versus Extraversion [EI], Sensing versus iNtuition [SN], Thinking versus Feeling [TF], and Judging versus Perceiving [JP]). Each word pair involves a semantic differential scale in which a seven-point Likert scale is presented between each pair of words, and participants chose the number that represents which word best describes them. The 38 sentence items also invoke a seven-point Likert scale response format; here the participants rate the

degree to which they agree or disagree with each statement.

Myers-Briggs

In Study 2, participants also completed Form F of the Myers-Briggs measure. This measure consists of 166 items, and tends to yield scores with reasonable reliability and validity (Myers & McCaulley, 1985). Of course, it is important not to overinterpret psychometric results from previous studies, in that score integrity is in part a function of the participant sample, and not only of a given measure. Thus, score characteristics fluctuate upon each administration, which is why methods such as validity generalization (Schmidt & Hunter, 1977) and reliability generalization (Vacha-Haase, 1998) are so important.

Study 1

Participants

The sample for Study 1 consisted of 207 college students enrolled at a large university in the western United States. There were more females (n = 130; 63%) than males in the sample. The ages of participants ranged from 18 to 38 (M = 19.7; SD = 2.9). The sample was predominantly non-minority (n = 183; 88%). The participants represented eight different majors, but in particular included 40 liberal arts (19%), 38 business (18%), and 37 applied human sciences (18%) majors.

Results

The first research question asked, "What are the stability (i.e., test-retest) reliability coefficients of scores on the four PPSDQ scales?". To address this research question, the 207 participants in Study 1 completed the PPSDQ twice, with a delay of

approximately two weeks.

Table 1 presents alpha coefficients for each of the four PPSDQ scales at both administrations. The table also presents the stability reliability coefficients for the four scales in both the present study and, for comparative purposes, the previous study involving a somewhat smaller sample size (n = 143; Thompson & Arnau, 1998).

INSERT TABLE 1 ABOUT HERE.

Study 2

Participants

The sample for Study 2 consisted of 894 college students, none of whom participated in Study 1, who were enrolled at a large university in the western United States. There were roughly equal numbers of females (n = 450; 50%) and males (n = 444; 50%) in the sample. The ages of participants ranged from 17 to 49 (M = 19.4; SD = 2.8). The sample was predominantly non-minority (n = 760; 85%), although a noteworthy number of Hispanics (n = 48; 5%) also participated. Participants represented eight different majors, but in particular included 177 undecided (20%), 167 liberal arts (19%), 147 business (16%), 126 natural sciences (14%), and 124 applied human sciences (14%) majors.

Results

The second research question asked, "What are the internal-consistency (i.e., alpha) reliability coefficients of scores on the four PPSDQ scales?". Table 2 presents the possible and the actual

score ranges on the four PPSDQ scales. And the table presents Cronbach's alpha coefficients for the four scales in the present study. For comparative purposes, Table 2 also presents related results from the Kier et al. (1998) involving 641 students from two universities other than the university involved in the present study, and from the Mittag (in press) study involving 328 Hispanic high school students.

INSERT TABLE 2 ABOUT HERE.

The third research question asked, "What are the concurrent validity coefficients of scores on the four PPSDQ scales with related continuous scores from the Myers-Briggs measure?". Table 3 presents the bivariate correlation coefficients among scores on the four PPSDQ and the four Myers-Briggs scales, including the four bivariate concurrent validity coefficients for like scales.

INSERT TABLE 3 ABOUT HERE.

However, to avoid inflation of experimentwise error, and to better model multivariate relationships among the scores, we also addressed the third research question by employing structural equation modeling (Thompson, in press). SEM requires at least three measured variables per construct. In our analysis we employed the four Myers-Briggs continuous scores as measured variables. We also created two PPSDQ measured variable scores per construct by randomly dividing each of the four sets of PPSDQ items into two subsets and adding together scores on each subset of items. Because the PPSDQ, unlike the Myers-Briggs, does not use item weights to

compute scores this is the same process used to create scale scores on the PPSDQ.

Figure 1 elaborates both the model and the standardized maximum-likelihood parameter estimates for our model. So that the model would be statistically "identified," the variances of the four latent constructs were each fixed to equal one. The model evaluated whether the PPSDQ and the Myers-Briggs scales measure the same four constructs.

INSERT FIGURE 1 ABOUT HERE.

Various "fit" statistics are available to evaluate model fit to data in SEM. Recent thinking (cf. Fan, Thompson & Wang, 1999; Hu & Bentler, 1999) suggests that several indices must be employed and that the normed fit index, the comparative fit index, and the root mean square error of approximation are particularly informative. In general it is hoped that the first two indices will be greater than .95 while the last index will be less than .06. For the Figure 1 results, these statistics were .973, .968, and .073, respectively.

Discussion

The two studies were undertaken to address three research questions. First, regarding the stability reliability coefficients for scores on the four PPSDQ scales, the coefficients ranged from .90 to .95, as reported in Table 1. These results were slightly more favorable than those reported by Thompson and Arnau (1998) for a somewhat smaller sample.

The Table 1 PPSDQ results are also more favorable than the related Myers and Briggs results reported for various stability

reliability studies involving college students and time delays ranging from 1 to 8 weeks. The test-retest coefficients on the four scales in the studies (Myers & McCaulley, 1985, p. 172) ranged from .56 to .89 (M = .79, SD = .07).

Regarding the second research question, involving the internal consistency of PPSDQ scores, alpha coefficients for the four scales in the present study ranged from .88 to .92, as reported in Table 2. These coefficients were slightly better than but generally comparable to related results reported by Kier et al. (1998) for a similar sample of college students from two other universities. These coefficients were higher than those reported for a sample of Hispanic high school seniors (Mittag, in press). Such differences might be expected, because the PPSDQ was administered in English, and for many of the high school students Spanish was declared as the primary language spoken in their homes.

The Table 2 PPSDQ findings are also more favorable than the related Myers and Briggs results reported for a sample of 9,216 participants. Alpha coefficients in that study (Myers & McCaulley, 1985, p. 169) of the four scales ranged from .76 to .83. Thus, the present results reflect quite favorably on the psychometric properties of PPSDQ.

Regarding the third research question, both bivariate and multivariate methods were employed. The classical bivariate concurrent validity coefficients between like PPSDQ and Myers-Briggs scale scores ranged from .76 to .84, as reported in Table 2.

It is noteworthy that the SN and JP scores were highly correlated on both the PPSDQ (r = .58) and the Myers-Briggs (r =

.505). However, noteworthy correlations between these two scales are typical in that "for various populations... EI, SN, TF, and JP tend to be independent of each other, except that SN and JP tend to be significantly and positively correlated" (Myers & McCaulley, 1985, p. 150). What is noteworthy here is that the *patterns* of bivariate relationships reported in Table 3 for the PPSDQ (e.g., $r_{EI \times SN} = -.23$) and the Myers-Briggs (e.g., $r_{EI \times SN} = -.10$) are so markedly similar for the six unique bivariate correlation comparisons.

The structural equation modeling results reported in Figure 1 are equally encouraging. The SEM results differ from the Table 3 results in that the SEM results (a) are multivariate rather than bivariate, (b) explicitly and directly estimate measurement error as part of the evaluation, and (c) use maximum-likelihood rather than ordinary least squares as the statistical estimation theory (Thompson, in press). The Figure 1 path coefficients indicate that the PPSDQ and the Myers-Briggs scores are roughly equivalent as measures of the four underlying constructs.

Limitations

No study is without limitations, and the present study is no exception. Although the participants were college students from a university not previously represented in this line of inquiry, more studies with more diverse samples are nevertheless warranted. However, Mittag's (in press) results with Hispanic high school students were not unlike those in the present study.

Implications

The present study involved fairly large samples, and examined the psychometric properties of PPSDQ scores from several analytic

perspectives, including a concurrent validity analysis using structural equation modeling (SEM). These results do seem to have some implications for counselors.

Certainly the results here regarding the psychometric properties of PPSDQ scores were very encouraging, were consistent with related previous results for the same measure (cf. Arnau et al., in press; Kier et al., in press; Mittag, in press; Thompson & Arnau, 1998), and were as good as or superior to results reported for the Myers and Briggs measure (Myers & McCaulley, 1985). The PPSDQ avoids problems with (a) dichotomous scoring, (b) forced-choice response formats, and (c) differential gender weighting of item responses.

However, the view taken here is not that counselors should search for the ideal single measure of any psychological construct. Instead, assessment tools provide the basis for counselors and clients to explore counseling issues. It may be useful to employ a battery of measures, rather than a single idealized measure, when exploring issues of particular interest to a given client.

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Table 1

Coefficients from the Stability Reliability Study

PPSDQ	α at Occasion		Test-Retest r	
Scale	1	2	(n=143)	(n=207)
EI	.91	.92	.88	.94
SN	.88	.90	.84	.90
TF	.87	.90	.79	.90
JP	.91	.92	.87	.95

Note. Test-retest reliability coefficients for n=143 college students are from Thompson and Arnau (1998); all other results are for the present study.

Table 2

Descriptive Statistics for PPSDQ Scale Scores

Statistics/ Sample	PPSDQ Scale			
	EI	SN	TF	JP
Possible Range				
Minimum	21	23	24	25
Maximum	147	161	168	175
Present Study (n = 894)				
Actual Range				
Minimum	30	54	39	39
Maximum	144	160	153	159
M	69.97	104.30	108.48	99.38
SD	18.87	16.61	18.31	20.53
Coefficient α				
Kier et al. (1998)	.90	.87	.88	.89
Mittag (in press)	.85	.74	.70	.70
Present Study	.92	.89	.88	.89

[a]n = 641 college students.

[b]n = 328 Hispanic high school students.

Table 3

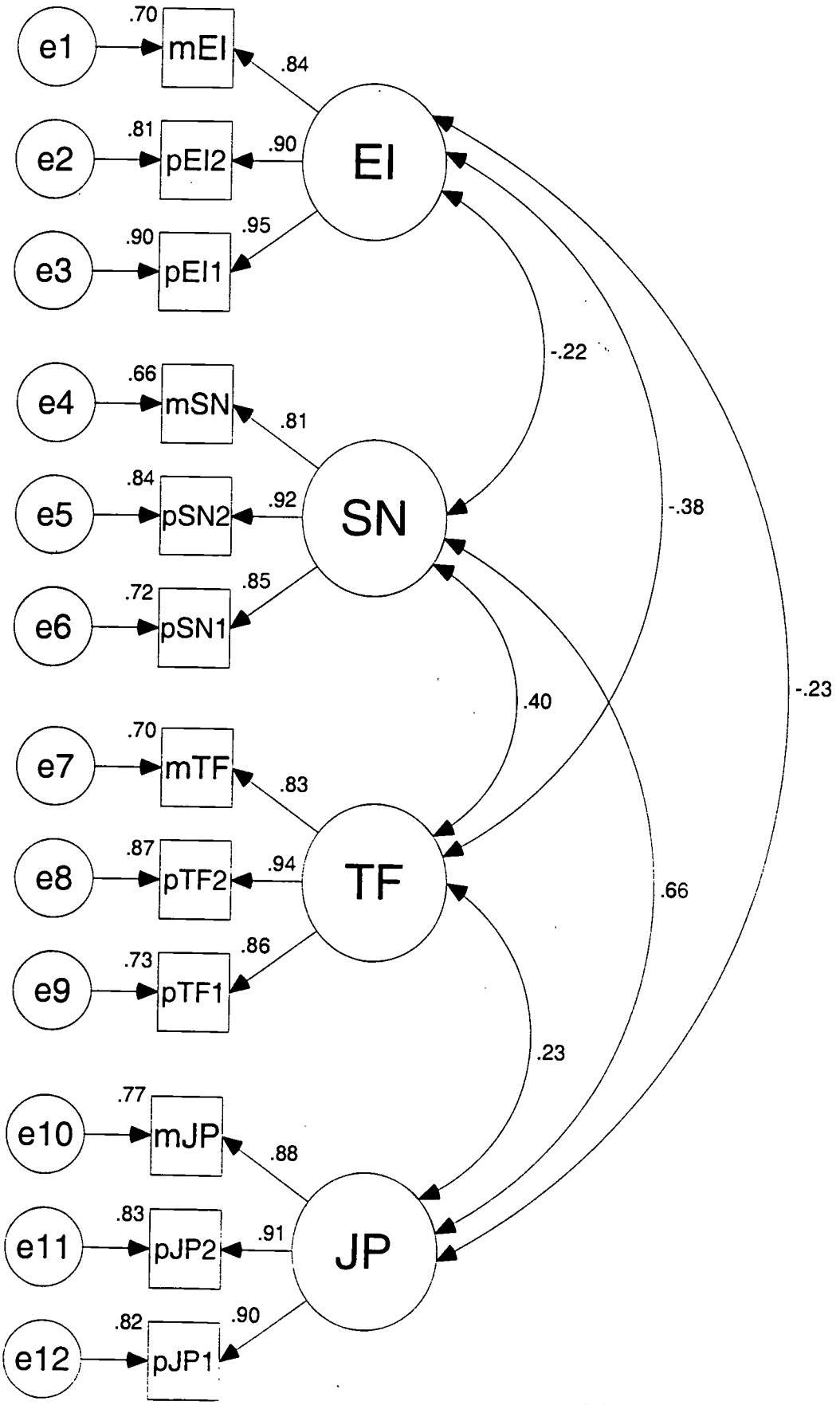
Concurrent Validity Coefficients (n = 894)

Measure/	PPSDQ				Myers-Briggs			
Scale	EI	SN	TF	JP	EI	SN	TF	JP
PPSDQ								
EI	1.000							
SN	-.228	1.000						
TF	-.344	.372	1.000					
JP	-.219	.583	.195	1.000				
Myers-Briggs								
EI	.807	-.166	-.266	-.210	1.000			
SN	-.111	.761	.279	.506	-.101	1.000		
TF	-.253	.297	.797	.161	-.242	.288	1.000	
JP	-.165	.529	.188	.837	-.144	.505	.207	1.000

Note. Concurrent validity correlations are double-underlined.

Figure 1

Concurrent Validity SEM Factor Analysis


e1
e2
e3
e4
e5
e6
e7
e8
e9
e10
e11
e12
mEI
pEI2
pEI1
mSN
pSN2
pSN1
mTF
pTF2
pTF1
mJP
pJP2
pJP1
EI
SN
TF
JP
.70
.84
.81
.90
.90
.95
.66
.81
.84
.92
.72
.85
.70
.83
.87
.94
.73
.86
.77
.88
.83
.91
.82
.90
-.22
-.38
-.23
.40
.66
.23

Appendix A.1
Item Analysis Statistics for PPSDQ EI Scale (n =894)

Variable	Reliability "Corrected" Discrimination	Reliability α if Deleted	Divergent Validity Social Desirability	PPSDQ SN	PPSDQ TF	PPSDQ JP	Myers EI
1 SociPriv	.730 (4)	.900 (3)	-.0039 (2)	-.0349 (4)	-.2037 (14)	-.0925 (10)	.655 (2)
2 FrieDist	.583 (9)	.904 (9)	-.1538 (21)	-.0260 (3)	-.3267 (20)	-.1132 (13)	.478 (10)
3 PersoShy	.753 (1)	.899 (1)	-.0139 (4)	-.0924 (12)	-.1784 (13)	-.0675 (8)	.645 (5)
4 ApprMyst	.430 (16)	.907 (16)	-.1028 (16)	.1018 (13)	-.1412 (9)	.0472 (5)	.342 (18)
5 MixerLon	.748 (2)	.900 (2)	-.0293 (9)	-.0203 (2)	-.2324 (16)	-.0943 (11)	.647 (3)
6 CongRecl	.341 (19)	.908 (18)	-.0125 (3)	-.0423 (7)	-.1268 (8)	-.0039 (1)	.241 (21)
7 ExubSere	.470 (15)	.906 (15)	.0871 (14)	-.0362 (5)	-.0767 (4)	-.0297 (3)	.381 (15)
8 GregTimi	.573 (10)	.904 (11)	.0023 (1)	-.1087 (14)	.0044 (1)	-.1245 (14)	.477 (11)
9 xQuieExp	.735 (3)	.900 (4)	.0363 (11)	-.1534 (19)	-.1679 (11)	-.1496 (16)	.679 (1)
10 xReflAct	.297 (20)	.910 (20)	.0219 (7)	.1210 (17)	.1007 (6)	.0219 (2)	.270 (19)
11 xIntrExt	.557 (12)	.904 (12)	.0169 (6)	-.0574 (8)	-.0997 (5)	-.0834 (9)	.468 (12)
12 xStillAn	.500 (14)	.905 (14)	-.0249 (8)	-.2288 (21)	-.2154 (15)	-.1772 (19)	.404 (13)
13 xSoliAmi	.524 (13)	.905 (13)	-.0794 (12)	-.0734 (11)	-.2395 (18)	-.0959 (12)	.398 (14)
14 xSoliGab	.688 (5)	.901 (5)	.0865 (13)	-.0096 (1)	-.1551 (10)	-.0350 (4)	.622 (7)
15 Shyperso	.568 (11)	.904 (10)	-.0154 (5)	-.0626 (9)	-.0145 (3)	-.0597 (7)	.584 (8)
16 Preswrit	.267 (21)	.913 (21)	-.0310 (10)	-.0409 (6)	.0089 (2)	-.1666 (17)	.253 (20)
17 xGrpproj	.385 (18)	.909 (19)	-.1131 (19)	-.1190 (16)	-.2371 (17)	-.2092 (20)	.362 (17)
18 xRelaxso	.656 (6)	.902 (6)	-.1061 (17)	-.0639 (10)	-.1247 (7)	-.1475 (15)	.645 (4)
19 xliketal	.418 (17)	.908 (17)	.1072 (18)	-.1166 (15)	-.3426 (21)	-.0553 (6)	.364 (16)
20 xNewpeop	.638 (7)	.902 (8)	-.1259 (20)	-.1729 (20)	-.2619 (19)	-.2222 (21)	.559 (9)
21 xTalkoth	.629 (8)	.902 (7)	-.0934 (15)	-.1423 (18)	-.1776 (12)	-.1680 (18)	.623 (6)
M	.547	.904	-.026	-.066	-.153	-.096	.481
SD	.146	.004	.071	.079	.109	.071	.143
Min	.267	.899	-.154	-.229	-.343	-.222	.241
Max	.753	.913	.107	.121	.101	.047	.679

Appendix A.2
Item Analysis Statistics for PPSDQ SN Scale (n =894)

Variable	Reliability "Corrected" Discrimination	Reliability α if Deleted	Divergent Validity Social Desirability	Divergent Validity EI	Divergent Validity PPSDQ TF	Divergent Validity JP	Myers SN
1 RealIntu	.508 (7)	.865 (7)	.0527 (11)	-.0852 (12)	.2584 (19)	.2985 (12)	.478 (6)
2 PrecImag	.604 (2)	.862 (2)	.0298 (4)	-.1537 (18)	.3173 (23)	.3362 (16)	.539 (1)
3 ConcExpl	.450 (14)	.867 (13)	.0835 (16)	-.1609 (19)	.1594 (13)	.3531 (19)	.344 (16)
4 TradCrea	.613 (1)	.862 (1)	.0470 (9)	-.1347 (16)	.1618 (14)	.3628 (20)	.535 (2)
5 DirIngen	.389 (17)	.869 (17)	-.0472 (10)	-.0091 (1)	.0191 (2)	.2325 (8)	.340 (17)
6 PlanVisi	.550 (5)	.864 (5)	-.0072 (1)	-.1372 (17)	.1426 (10)	.4611 (22)	.488 (5)
7 PracTheo	.461 (10)	.867 (10)	.0379 (6)	-.0203 (3)	.1857 (15)	.3017 (13)	.463 (8)
8 xInsiSys	.471 (9)	.866 (9)	.0463 (8)	-.1150 (15)	.2413 (18)	.3503 (18)	.364 (14)
9 xVariRep	.458 (13)	.867 (11)	.1021 (20)	-.1974 (22)	.1545 (12)	.4189 (21)	.378 (12)
10 xInvenOr	.579 (3)	.863 (3)	.0157 (2)	-.0745 (11)	.1250 (9)	.5359 (23)	.501 (4)
11 xInquCri	.388 (18)	.869 (18)	.1608 (22)	-.0728 (10)	.2973 (21)	.2233 (7)	.318 (19)
12 xDiverCo	.487 (8)	.866 (8)	.0996 (19)	-.1796 (21)	.2703 (20)	.3441 (17)	.397 (11)
13 xDivePre	.437 (15)	.867 (15)	.1399 (21)	-.2037 (23)	.3101 (22)	.3347 (15)	.352 (15)
14 xConcRea	.353 (19)	.870 (19)	.0254 (3)	.0629 (8)	.0850 (7)	.2349 (9)	.374 (13)
15 Diffpers	.419 (16)	.868 (16)	.2121 (23)	-.0461 (5)	.1197 (8)	.1692 (5)	.326 (18)
16 Useintui	.336 (20)	.870 (20)	.0951 (18)	-.0946 (13)	.1449 (11)	.1326 (4)	.204 (21)
17 Seepattr	.231 (22)	.873 (22)	.0411 (7)	.0558 (6)	-.0329 (4)	.0205 (2)	.165 (23)
18 Newskill	.178 (23)	.876 (23)	.0753 (15)	-.0165 (2)	.0160 (1)	.0225 (3)	.173 (22)
19 Seemeang	.325 (21)	.871 (21)	.0697 (13)	.0395 (4)	.0735 (6)	.0135 (1)	.258 (20)
20 Inventiv	.553 (4)	.864 (4)	.0315 (5)	-.0699 (9)	-.0332 (5)	.2512 (10)	.461 (9)
21 Creatnew	.534 (6)	.864 (6)	.0632 (12)	-.0960 (14)	.0326 (3)	.2671 (11)	.468 (7)
22 xPreffac	.461 (11)	.867 (14)	.0869 (17)	-.0577 (7)	.2119 (17)	.3056 (14)	.527 (3)
23 xMechani	.460 (12)	.867 (12)	.0736 (14)	-.1630 (20)	.2051 (16)	.2135 (6)	.422 (10)
M	.445	.867	.067	-.084	.151	.269	.386
SD	.108	.003	.054	.076	.103	.131	.109
Min	.178	.862	-.047	-.204	-.033	.014	.165
Max	.613	.876	.212	.063	.317	.536	.539

Appendix A.3
Item Analysis Statistics for PPSDQ TF Scale (n =894)

Variable	Reliability "Corrected" Discrimination	Reliability α if Deleted	Divergent Validity Social Desirability	Divergent Validity EI	Divergent Validity PPSDQ SN	Divergent Validity JP	Myers TF
1 DispEmot	.546 (6)	.877 (7)	.0588 (5)	-.1999 (16)	.1413 (11)	.0636 (7)	.541 (4)
2 JustHarm	.467 (14)	.879 (14)	.1508 (17)	-.0730 (5)	.2586 (23)	.2072 (22)	.418 (14)
3 ImpePers	.482 (13)	.879 (13)	.0913 (12)	-.3112 (23)	.1395 (10)	.0756 (9)	.391 (16)
4 PrinPeop	.427 (17)	.880 (17)	.1065 (13)	-.2675 (22)	.1838 (15)	.1991 (21)	.381 (17)
5 EvalNonj	.394 (21)	.881 (21)	.2237 (23)	-.0682 (4)	.1809 (14)	.1276 (16)	.344 (19)
6 FactComp	.634 (1)	.875 (1)	.1424 (16)	-.1506 (12)	.2420 (22)	.1347 (17)	.606 (1)
7 LogHuman	.484 (12)	.879 (12)	.1169 (15)	-.0286 (3)	.2274 (20)	.1426 (19)	.437 (10)
8 SkepTrus	.493 (10)	.878 (9)	.2148 (21)	-.2223 (20)	.0851 (5)	.0575 (6)	.419 (13)
9 StriForc	.569 (4)	.877 (5)	.2306 (24)	-.1786 (15)	.2109 (19)	.2515 (24)	.485 (7)
10 xEmpaLog	.542 (7)	.877 (6)	.0902 (11)	-.0885 (6)	.1890 (17)	.0948 (11)	.531 (5)
11 xCariCoo	.495 (9)	.878 (10)	.1863 (20)	-.0249 (2)	.0578 (3)	-.0897 (10)	.450 (9)
12 xOpenEva	.409 (19)	.881 (19)	.0500 (4)	-.4444 (24)	.1675 (13)	.1404 (18)	.308 (20)
13 xRecepSe	.335 (22)	.882 (22)	.1543 (18)	-.1726 (13)	.1365 (9)	.0710 (8)	.243 (23)
14 xSympFai	.456 (16)	.879 (16)	.0751 (8)	-.1097 (8)	.1162 (8)	.0536 (5)	.429 (11)
15 xGullSus	.426 (18)	.880 (18)	.0494 (3)	-.1267 (9)	.0705 (4)	.0345 (4)	.294 (21)
16 xKindAna	.567 (5)	.877 (4)	.1684 (19)	-.2290 (21)	.0522 (1)	.1199 (13)	.524 (6)
17 xFeelThi	.612 (3)	.875 (2)	.0836 (9)	-.2189 (18)	.1552 (12)	.1219 (14)	.603 (2)
18 xTendRat	.618 (2)	.875 (3)	.0729 (7)	-.1011 (7)	.1996 (18)	.1112 (12)	.587 (3)
19 xAcceDis	.461 (15)	.879 (15)	.2192 (22)	-.1505 (11)	.1842 (16)	.1220 (15)	.400 (15)
20 xLighPru	.492 (11)	.879 (11)	.0894 (10)	-.1753 (14)	.2605 (24)	.2356 (23)	.421 (12)
21 Avoidcon	.131 (24)	.890 (24)	-.0720 (6)	.2108 (17)	-.0980 (6)	-.0319 (2)	.162 (24)
22 Emotionl	.496 (8)	.878 (8)	.0308 (2)	-.2210 (19)	.1055 (7)	-.0320 (3)	.482 (8)
23 Sensitiv	.256 (23)	.885 (23)	.0020 (1)	.0090 (1)	.0577 (2)	.0014 (1)	.269 (22)
24 xBusines	.397 (20)	.881 (20)	.1132 (14)	-.1282 (10)	.2324 (21)	.1886 (20)	.349 (18)
M	.466	.879	.110	-.145	.148	.100	.420
SD	.112	.003	.074	.122	.081	.084	.113
Min	.131	.875	-.072	-.444	-.098	-.090	.162
Max	.634	.890	.231	.211	.261	.252	.606

Appendix A.4
Item Analysis Statistics for PPSDQ JP Scale (n =894)

Variable	Reliability "Corrected" Discrimination	Reliability α if Deleted	Divergent Validity Social Desirability	Divergent Validity PPSDQ EI	PPSDQ SN	PPSDQ TF	Myers JP
1 RespAdap	.431 (17)	.890 (15)	-.0203 (7)	-.0409 (4)	.3090 (14)	.0131 (2)	.359 (20)
2 PromFree	.509 (11)	.888 (11)	.1114 (25)	-.1505 (19)	.4331 (25)	.2448 (25)	.487 (12)
3 TimeRela	.561 (4)	.887 (4)	.0406 (12)	-.0867 (10)	.3122 (15)	.1279 (17)	.496 (10)
4 xFlexOrg	.632 (2)	.885 (2)	.0384 (11)	-.0598 (6)	.3327 (19)	.1425 (18)	.589 (2)
5 xRandSeq	.557 (6)	.887 (7)	-.0106 (5)	-.1776 (22)	.3172 (16)	.1895 (23)	.516 (5)
6 xImpuDel	.396 (21)	.891 (21)	-.0785 (22)	-.1890 (23)	.2667 (9)	.1782 (22)	.362 (19)
7 xImpeTas	.552 (8)	.887 (8)	.0102 (4)	-.1273 (15)	.3877 (24)	.2124 (24)	.495 (11)
8 Unschedu	.476 (13)	.889 (13)	.0719 (21)	-.0314 (3)	.2780 (11)	.0319 (3)	.442 (15)
9 Lastminu	.331 (24)	.893 (24)	-.0535 (17)	-.0689 (8)	.0855 (3)	-.0531 (6)	.296 (24)
10 Unexpect	.559 (5)	.887 (5)	.0450 (13)	-.2883 (25)	.3729 (23)	.0815 (10)	.501 (8)
11 Noorgani	.463 (14)	.889 (14)	-.0039 (2)	-.0675 (7)	.3280 (18)	.1674 (21)	.468 (14)
12 Gowiflow	.404 (20)	.890 (20)	.0208 (8)	-.1136 (13)	.0832 (2)	.1444 (19)	.392 (17)
13 Lastmint	.430 (18)	.890 (18)	-.0048 (3)	-.1619 (20)	.1692 (5)	.0092 (1)	.374 (18)
14 Formomen	.557 (7)	.887 (6)	.0791 (23)	-.2482 (24)	.3251 (17)	.1483 (20)	.541 (4)
15 Orderirr	.527 (10)	.888 (9)	-.0270 (10)	-.0743 (9)	.2612 (8)	.0661 (8)	.514 (6)
16 xThinkah	.497 (12)	.888 (12)	.0165 (6)	-.1273 (14)	.1751 (7)	.0864 (11)	.481 (13)
17 xImpulsi	.379 (22)	.891 (22)	-.0004 (1)	-.1765 (21)	.3572 (21)	.1259 (16)	.327 (22)
18 xStrutim	.529 (9)	.888 (10)	.0258 (9)	-.1398 (17)	.3349 (20)	.0977 (13)	.503 (7)
19 xEnjlist	.447 (15)	.890 (17)	.0872 (24)	.0212 (2)	.1717 (6)	-.0450 (4)	.499 (9)
20 xHaterus	.418 (19)	.890 (19)	-.0687 (18)	-.0926 (11)	.1255 (4)	-.0586 (7)	.348 (21)
21 xRoucomf	.597 (3)	.886 (3)	.0718 (20)	-.1307 (16)	.3711 (22)	.0457 (5)	.587 (3)
22 xLclosur	.344 (23)	.892 (23)	.0455 (14)	-.0415 (5)	.2725 (10)	.1094 (14)	.302 (23)
23 xBeontim	.436 (16)	.890 (16)	.0532 (16)	-.0960 (12)	.3074 (13)	.1196 (15)	.404 (16)
24 xCommitm	.164 (25)	.895 (25)	-.0704 (19)	-.0183 (1)	.0738 (1)	-.0811 (9)	.167 (25)
25 xPlanahe	.651 (1)	.885 (1)	.0500 (15)	-.1445 (18)	.3073 (12)	.0874 (12)	.639 (1)
M	.474	.889	.017	-.113	.270	.088	.444
SD	.105	.002	.050	.070	.100	.086	.106
Min	.164	.885	-.079	-.288	.074	-.081	.167
Max	.651	.895	.111	.021	.433	.245	.639

pptamm99.wk1

Appendix B
Gender Differences on PPSDQ Scales

PPSDQ Scale	Females (450) α	M	SD	Males (444) α	M	SD	Standardized Difference	eta²
ExtrIntr	.919	67.46	19.65	.894	72.51	17.71	.27	1.8%
SensINtu	.887	104.11	17.24	.858	104.49	15.96	.02	.0%
ThinFeel	.860	116.08	16.17	.861	100.78	17.12	-.84	17.5%
JudgPerc	.908	96.36	21.46	.870	102.45	19.09	.30	2.2%

ppsdq15t.wk1 5/31/99

Appendix C
Variance/Covariance Matrix (n = 894)

	Variable											
Var.	mEI	pEI1	pEI2	mSN	pSN1	pSN2	mTF	pTF1	pTF2	mJP	pJP1	pJP2
mEI	733.94											
pEI1	231.44	116.22										
pEI2	180.94	81.00	77.42									
mSN	-77.52	-32.38	-26.66	800.70								
pSN1	-33.13	-15.71	-15.15	149.46	60.00							
pSN2	-41.62	-21.05	-19.41	208.01	59.34	96.90						
mTF	-166.13	-76.08	-44.84	206.93	61.71	63.40	642.99					
pTF1	-44.72	-26.41	-18.15	57.39	25.31	23.08	167.13	81.06				
pTF2	-87.40	-44.84	-29.52	87.04	32.15	32.65	202.83	73.92	106.17			
mJP	-115.32	-46.53	-45.14	420.57	104.13	154.57	154.88	36.55	65.00	867.77		
pJP1	-49.61	-19.17	-16.50	148.74	40.31	58.60	36.98	9.45	21.68	248.68	113.01	
pJP2	-67.37	-25.53	-23.48	145.29	40.59	59.01	46.63	14.40	27.82	257.10	95.14	117.75

Note. The Myers-Briggs (1985, p. 10) continuous scores are labelled with a prefix of "m"; the PPSDQ scale scores are labelled with a prefix of "p".

ppsdqcov.wk1 5/31/99 n=894

Appendix D

Varimax-rotated Component Function/Structure Coefficients (n=894)

Variable	Factor I	II	III	IV
SOCIPRIV	.07031	.76363	.14362	.07462
FRIEDIST	-.00402	.58427	.32910	.01984
PERSOSHY	.01093	.79378	.11874	-.08798
APPRMYST	-.09520	.45914	.19387	.17628
MIXERLON	.05356	.76873	.18353	.07866
CONGRECL	-.09351	.36588	.14899	-.08632
EXUBSERE	.02964	.52313	-.01929	.01389
GREGTIMI	.11392	.62527	-.07760	-.13082
QUIEEXPR	-.07969	-.77595	-.07535	.13630
REFLACTI	.00584	-.39380	.19782	-.09913
INTREXTR	-.03494	-.59410	-.03769	.03245
STILLANI	-.06607	-.50372	-.17586	.26237
SOLIAMIC	-.04797	-.52008	-.22405	.02198
SILEGABB	-.02314	-.73148	-.11008	-.05741
SHYPERSO	.06421	.65702	-.09136	-.02859
PRESWRIT	.16929	.29882	-.08186	-.01652
GRPPROJE	-.20163	-.37601	-.18926	.04028
RELAXSOC	-.10433	-.71287	-.02575	.02986
LIKETALK	.05546	-.41345	-.34074	.10022
NEWPEOPL	-.14959	-.63918	-.19062	.12803
TALKOTHR	-.13314	-.66914	-.09250	.11966
EXTRAVER	**-.12445**	**-.83886**	**-.12315**	**-.00573**
INTROVER	**.10762**	**.84202**	**.11058**	**-.00204**
REALINTU	-.29065	-.00103	-.24704	.43577
PRECIMAG	-.28293	-.08362	-.29418	.51783
CONCEXPL	-.32052	-.13722	-.11588	.35889
TRADCREA	-.30818	-.09244	-.10575	.57792
DIRINGEN	-.21138	.00766	-.00353	.41260
PLANVISI	-.44024	-.09285	-.09615	.43928
PRACTHEO	-.26601	.06511	-.17790	.42289
INSISYST	.29290	.14116	.23280	-.36365
VARIREPE	.39344	.22221	.12963	-.31855
INVENORG	.57119	.01711	.04843	-.42312
INQUCRIT	.18363	.00952	.36344	-.29234
DIVERCON	.31927	.14151	.26642	-.34478
DIVEPREC	.35260	.13761	.33376	-.23666
CONCREAL	.24837	-.15376	.08826	-.31815
DIFFPERS	-.06688	-.01769	-.08804	.50617
USEINTUI	.00622	-.15386	-.11978	.40762
SEEPATTR	.12081	.05498	.06438	.44004
NEWSKILL	.05971	.00713	.00202	.31191
SEEMEANG	.14080	.01418	-.05471	.52227
INVENTIV	-.15088	-.08473	.12535	.67725

CREATNEW	-.15121	-.07929	.06124	.65167
PREFFACT	.26583	-.00062	.15125	-.44568
MECHANIC	.11656	.11436	.18917	-.48285
SENSING	**.36755**	**.00462**	**.17984**	**-.72088**
INTUITIO	**-.42103**	**.01044**	**-.20444**	**.66679**
DISPEMOT	.09515	-.17961	-.58805	.12916
JUSTHARM	-.17321	.03066	-.49975	.12862
IMPEPERS	.02821	-.38552	-.44693	.14772
PRINPEOP	-.17332	-.27829	-.41909	.03745
EVALNONJ	-.08993	.00645	-.41495	.12987
FACTCOMP	-.03981	-.05824	-.68541	.14434
LOGHUMAN	-.08068	.05287	-.54218	.15127
SKEPTRUS	-.02691	-.16686	-.52033	-.05578
STRIFORG	-.19709	-.11049	-.58495	.07489
EMPALOGI	.04587	.00976	.61754	-.07641
CARICOOL	-.23043	.02332	.57401	-.09104
OPENEVAL	.10346	.50063	.33635	-.08490
RECEPSEL	.04304	.18683	.32813	-.08901
SYMPFAIR	.00516	.01890	.52532	.04555
GULLSUSP	.02409	.09069	.45485	.09776
KINDANAL	.03172	.18849	.61812	.04455
FEELTHIN	.02471	.13589	.67409	-.04324
TENDRATI	.03468	.01773	.69251	-.08100
ACCEDISC	.03889	.13562	.47597	-.13850
LIGHPRUD	.18914	.16666	.48981	-.12466
AVOIDCON	.01555	.29045	-.27164	-.19551
EMOTIONL	.17696	-.21509	-.53408	.13963
SENSITIV	.01232	.07149	-.32681	-.03398
BUSINESS	.17789	.06038	.42759	-.08574
THINKING	**.05701**	**.12263**	**.84942**	**-.06078**
FEELING	**-.09415**	**-.07623**	**-.81173**	**.09399**
RESPADAP	-.45517	.01725	.03164	.21550
PROMFREE	-.49285	-.07422	-.24524	.29772
TIMERELA	-.59846	.00704	-.12443	.11389
FLEXORGA	.68592	-.00133	.11744	-.09767
RANDSEQU	.59314	.11796	.16111	-.09168
IMPUDELI	.37914	.16647	.15755	-.15964
IMPETASK	.56968	.03945	.22009	-.14466
UNSCHEDU	-.50158	.02071	.03168	.16959
LASTMINU	-.34582	-.06952	.09833	-.01183
UNEXPECT	-.51571	-.29411	.03634	.28153
NOORGANI	-.43891	-.01584	-.11315	.23292
GOWIFLOW	-.46195	-.00592	-.14012	-.09487
LASTMINT	-.41940	-.15500	.07244	.04440
FORMOMEN	-.55026	-.21176	-.07425	.18030
ORDERIRR	-.59812	.00016	-.01271	.03816
THINKAHE	.60299	.04122	.07115	.10508
IMPULSIV	.32071	.17443	.03595	-.30700
STRUTIME	.53721	.10982	.06371	-.15947
ENJLISTS	.57911	-.08415	-.10775	.01775
HATERUSH	.46069	.09435	-.11829	.04907

ROUCOMFR	.65195	.09714	-.03380	-.16797
LCLOSURE	.36564	-.02339	.11234	-.12784
BEONTIME	.47871	-.00891	.08432	-.09412
COMMITMN	.25338	.00641	-.10659	.08441
PLANAHEA	.72053	.05512	.02781	-.02050
JUDGING	**.84884**	**.04140**	**.12240**	**-.18969**
PERCEIVI	**-.85951**	**-.06400**	**-.09345**	**.16769**

Note. Coefficients for Myers-Briggs (1985, p. 10) continuous scores are presented in **bold**. Coefficients > |.3| are underlined.

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